

WHAT IS CLAIMED IS:

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1. A coating to be applied to an electrically conductive material, said coating consisting of more than 1.0 wt% to about 20 wt% silver and the balance essentially tin and having a melting point greater than 225°C.

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2. A coating according to claim 1, wherein said silver content in said coating is in the range of from 2.0 wt% to 15 wt%.

3. A coating according to claim 1, wherein said silver content in said coating is in the range of from 3.0 wt% to 10 wt%.

4. A coating according to claim 1, wherein said coating has a thickness in the range of from 0.00001" to 0.001".

5. A coating according to claim 1, wherein said coating has a hardness in the range of from 0.32 to 0.41 GPa.

6. A coating according to claim 1, wherein said coating is a non-electroplated coating.

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7. A coating material consisting of more than 1.0 wt% to 20 wt% silver, an effective amount up to about 5.0 wt% of at least one element selected from the group consisting of bismuth, silicon, copper, magnesium, iron, nickel, manganese, zinc, antimony, and the balance essentially tin.

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8. A coating material according to claim 7, wherein said silver content of said coating material is in the range of from 2.0 wt% to 15 wt%.

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9. A coating material according to claim 7, wherein said silver content of said coating material is in the range of from 3.0 wt% to 10 wt%.

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10. A coating material according to claim 7, wherein said at least one element is present in an amount which does not cause the formation of deleterious oxides.

11. A coating material according to claim 10, wherein said at least one element is present in an amount ranging from 0.1 wt% to said amount which does not cause the formation of deleterious oxides.

12. A coating material according to claim 7, wherein said coating has a thickness in the range of from 0.00001" to 0.001".

13. A coating material according to claim 7, wherein said coating material has a hardness in the range of from 0.32 to 0.41 GPa.

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14. A coating material according to claim 7, wherein said coating material is a non-electroplated material and has a melting point greater than 225°C.

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15. A composite comprising a substrate material and a layer of coating material on at least a portion of said substrate material and said coating material consisting of more than 1.0 wt% to about 20 wt% silver and the balance essentially tin.

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16. A composite according to claim 15, wherein said silver content of said coating material is in the range of from 2.0 wt% to 15 wt%.

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17. A composite according to claim 15, wherein said silver content of said coating material is in the range of from 3.0 wt% to 10 wt%.

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18. A composite according to claim 15, wherein said substrate material comprises a ferrous based material or a non-ferrous based material.

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~~19. A composite according to claim 15, wherein said substrate material comprises a copper-tellurium alloy.~~

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~~20. A composite according to claim 15, wherein said coating material directly contacts a surface of said substrate material.~~

~~21. A composite according to claim 15, wherein said coating material has a melting point greater than 225°C.~~

~~22. A composite according to claim 15, wherein said coating material has a hardness in the range of from 0.35 to 0.45 GPa.~~

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23. A composite according to claim 15, wherein said coating material has a thickness in the range of from 0.00001" to about 0.001".

24. A composite according to claim 15, wherein said composite comprises an electrical connector.

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25. A composite comprising a substrate material and a layer of coating material over at least a portion of said substrate material, and said coating material consisting of more than 1.0 wt% to about 20 wt% silver, an effective amount up to at least 5.0 wt% of at least one element selected from the group consisting of bismuth, silicon, copper, magnesium, iron, nickel, manganese, zinc, antimony, and the balance essentially tin.

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26. A composite according to claim 25, wherein said silver is present in an amount from 2.0 wt% to 15 wt%.

27. A composite according to claim 25, wherein said silver is present in an amount from 3.0 wt% to 15 wt%.

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28. A composite according to claim 25, wherein said substrate material is formed from a non-ferrous based material or a ferrous based material.

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29. A composite according to claim 25, wherein said substrate material is formed from a copper-tellurium alloy.

30. A composite according to claim 25, wherein said coating material has a hardness in the range of from 0.32 to about 0.41 GPa.

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31. A composite according to claim 25, wherein said coating material has a thickness in the range of from 0.00001" to 0.001".

32. A composite according to claim 25, wherein said coating material is a non-electroplated coating material.

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33. A composite according to claim 25, wherein said at least one element is present in an amount from 0.1 wt% up to an amount which does not create deleterious oxides.

34. A composite according to claim 25, wherein said coating material directly contacts a surface of said substrate material.

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35. A composite according to claim 25, wherein said coating material has a melting point greater than 225°C.

36. A process for coating a substrate material comprising the steps of:

providing a substrate material to be coated;

preparing a bath consisting of more than 1.0 wt% to about 20 wt% silver and the balance essentially tin; and

immersing said substrate material in said bath to form a coating layer on said substrate material, which coating layer consists of more than 1.0 wt% to about 20 wt% silver.

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37. A process according to claim 36, wherein said preparing step comprises preparing a bath containing from 2.0 wt% to 15 wt% silver and the balance essentially tin.

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38. A process according to claim 36, wherein said preparing step comprises preparing a bath containing from 3.0 wt% to 10 wt% silver.

39. A process according to claim 36, further comprising maintaining said bath at a temperature greater than 500°F during said immersing step.

40. A process according to claim 39, wherein said maintaining step comprises maintaining said bath at a temperature of from 500°F to 900°F during said immersing step.

41. A process according to claim 36, wherein said immersing step comprises continuously passing said substrate material through said bath.

42. A process according to claim 36, wherein said immersing step comprises discontinuously passing said substrate material through said bath.

43. A process according to claim 36, wherein said immersing step comprises immersing a batch of said substrate material into said bath and maintaining said

batch within said bath for a time period sufficient to form said coating.

44. A process according to claim 36, further comprising keeping said substrate material resident in said bath for a time period in the range of from 0.2 seconds to 10 seconds.

45. A process according to claim 36, further comprising applying a lubricant to surfaces of said substrate material after said immersing step.

46. A process for forming a non-electroplated coating on a substrate material comprising the steps of:

preparing a bath consisting of more than 1.0 wt% to about 20 wt% silver, an effective amount up to about 5.0 wt% of at least one element selected from the group consisting of bismuth, silicon, copper, magnesium, iron, nickel, manganese, zinc, antimony, and the balance essentially tin; and

maintaining said bath at a temperature of at least 500°F; and

immersing said substrate material in said bath for a resident time period of from 0.2 to 10 seconds.

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47. A process according to claim 46, wherein said immersing step comprises continuously passing said substrate material through said bath.

48. A process according to claim 46, wherein said immersing step comprises discontinuously passing said substrate material through said bath.

49. A process according to claim 46, wherein said immersing step comprises introducing a batch of said substrate material into said bath.

50. A process according to claim 46, wherein said maintaining step comprises maintaining said bath at a temperature in the range of 500°F to 900°F.